

算出磁界と測定磁界の射影成分が一致する信号磁界 源の位置と方位角を以下の方程式を解いて算出する

$$\min_{\mathbf{r}_{c}, \boldsymbol{\theta}} \left\{ \sum_{k=1}^{N_{m}} w_{k} \middle| \left\langle H_{m}^{P} \left( \mathbf{r}_{k} - \mathbf{r}_{c}, \boldsymbol{\theta}_{c}, \boldsymbol{t} \right) \right\rangle_{t} - H_{c}^{P} \left( \mathbf{r}_{k} - \mathbf{r}_{c}, \boldsymbol{\theta}_{c} \right) \right| \right\}.$$

or

$$\min_{\mathbf{r}_{c}, \mathbf{d}} \left\{ \sum_{k=1}^{N_{m}} w_{k} \middle| \sqrt{\left\langle H_{m}^{P} \left( \mathbf{r}_{k} - \mathbf{r}_{e}, \mathbf{\theta}_{e}, \mathbf{1} \right)^{2} \right\rangle_{l}} - H_{e}^{P} \left( \mathbf{r}_{k} - \mathbf{r}_{e}, \mathbf{\theta}_{e} \right) \middle| \right\}.$$

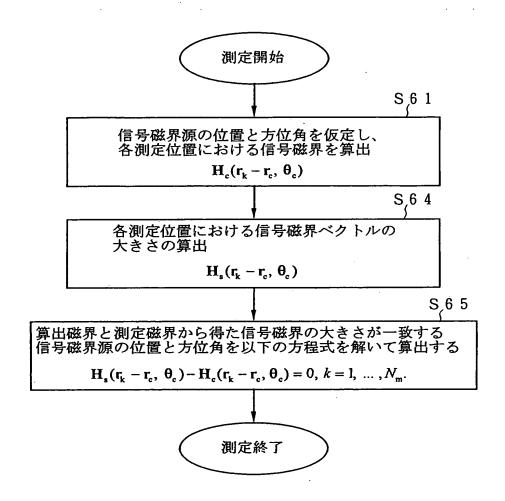
or

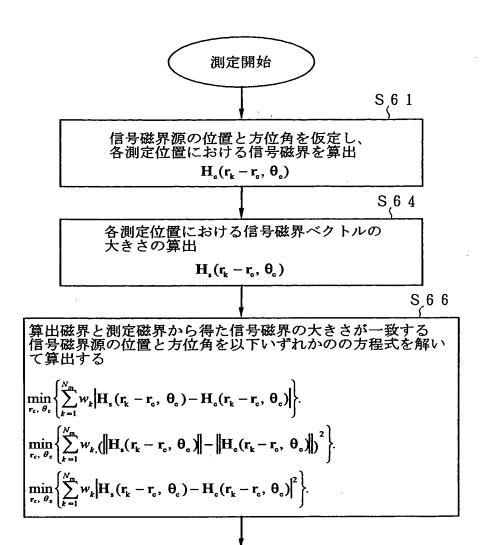
$$\min_{\mathbf{r}_{\mathrm{c}},\ \theta_{\mathrm{z}}} \left\{ \sum_{k=1}^{N_{\mathrm{m}}} w_{k} \left| \left\langle H_{\mathrm{m}}^{\mathrm{P}} \left( \mathbf{r}_{\mathrm{k}} - \mathbf{r}_{\mathrm{c}}, \ \boldsymbol{\theta}_{\mathrm{c}}, \ \boldsymbol{t} \right) \right\rangle_{t} - H_{\mathrm{e}}^{\mathrm{P}} \left( \mathbf{r}_{\mathrm{k}} - \mathbf{r}_{\mathrm{c}}, \ \boldsymbol{\theta}_{\mathrm{c}} \right) \right|^{2} \right\}.$$

OI

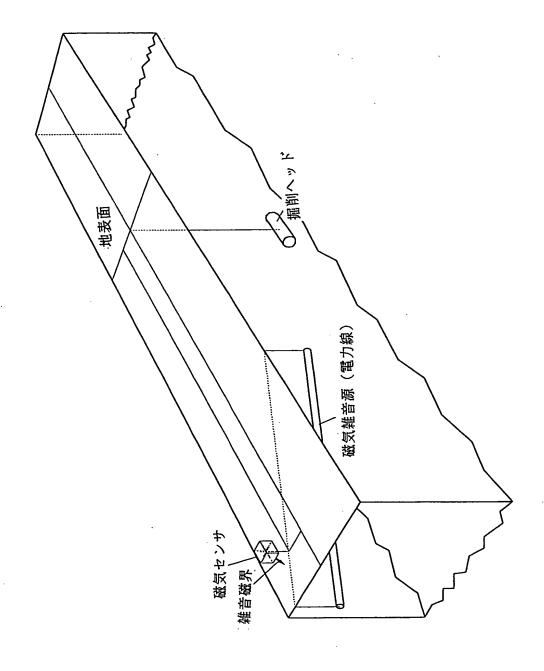
$$\min_{\mathbf{r}_{c},\ \theta_{z}} \left\{ \sum_{k=1}^{N_{m}} w_{k} \middle| \sqrt{\left|H_{m}^{P}\left(\mathbf{r}_{k} - \mathbf{r}_{c},\ \boldsymbol{\theta}_{c},\ t\right)^{2}\right\rangle_{t}} - H_{c}^{P}\left(\mathbf{r}_{k} - \mathbf{r}_{c},\ \boldsymbol{\theta}_{c}\right)^{2} \right\}.$$

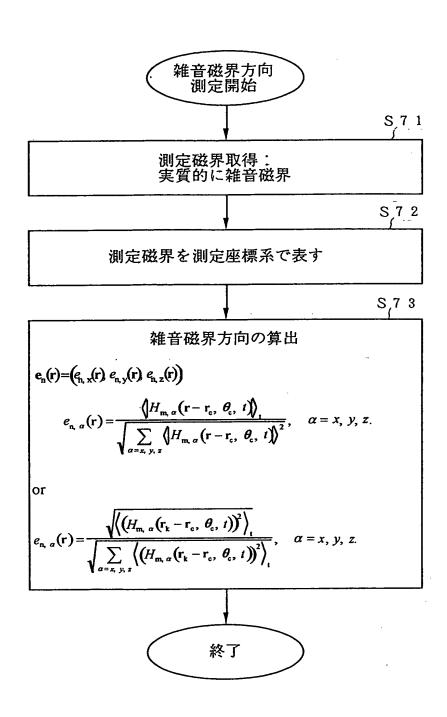
測定終了

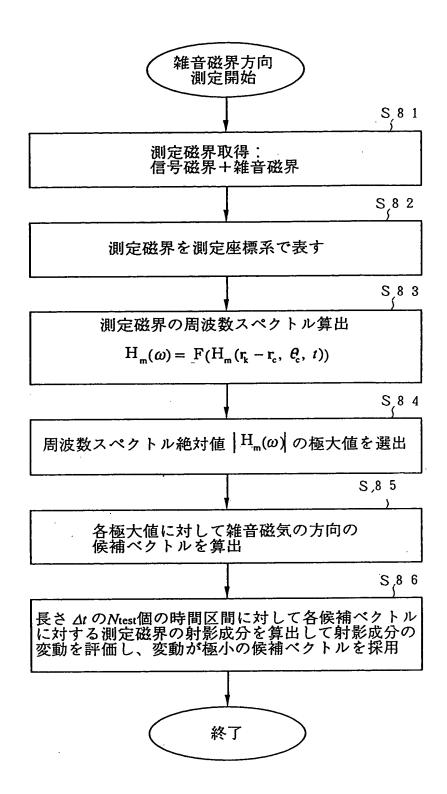


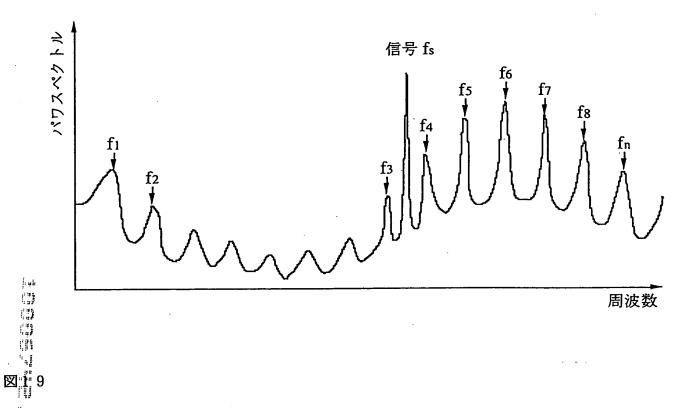


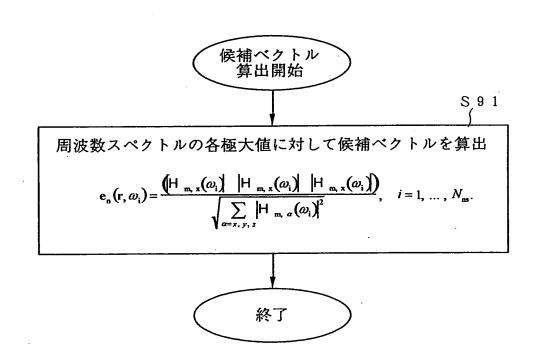
測定終了













S,1 0 1

周波数スペクトルの各極大値に対して当該周波数を中心 周波数とする狭帯域フィルタにより、測定磁界注の当該 周波数成分を抽出

S\_1 0 2

フィルタリングにより抽出された各周波数成分に対して 候補ベクトル

$$e_n(r) = (e_{n,x}(r), e_{n,y}(r), e_{n,z}(r))$$

を以下のいずれかの処理により算出

$$e_{n,\alpha}(\mathbf{r}, \omega_i) = \frac{\left\langle \left| H_{m,\alpha}(\mathbf{r} - \mathbf{r}_c, \theta_c, \omega_i, t) \right\rangle \right\rangle_t}{\sqrt{\sum_{\alpha=x,y,z}} \left\langle \left| H_{m,\alpha}(\mathbf{r} - \mathbf{r}_c, \theta_c, \omega_i, t) \right\rangle^2},$$

$$\alpha = x, y, z; i = 1, ..., N_{rs}$$

または

$$e_{n, \alpha}(\mathbf{r}, \omega_{i}) = \frac{\sqrt{\langle (H_{m, \alpha}(\mathbf{r}_{k} - \mathbf{r}_{c}, \theta_{c}, \omega_{i}, t))^{2} \rangle_{t}}}{\sqrt{\sum_{\alpha = x, y, z} \langle (H_{m, \alpha}(\mathbf{r}_{k} - \mathbf{r}_{c}, \theta_{c}, \omega_{i}, t))^{2} \rangle_{t}}},$$

 $\alpha = x, y, z; i = 1, ..., N_{ms}$ 

終了



S<sub>1</sub>111

長さ At のNiest個の時間区間に対して各候補ベクトルに 直交する平面への測定磁界の射影成分を算出

$$\mathbf{H}_{m}^{P}(\mathbf{r} - \mathbf{r}_{c}, \; \boldsymbol{\theta}_{c}, \; \omega_{i}, \; t) = \mathbf{H}_{m}(\mathbf{r} - \mathbf{r}_{c}, \; \boldsymbol{\theta}_{c}, \; t)$$

$$- (\mathbf{H}_{m}(\mathbf{r} - \mathbf{r}_{c}, \; \boldsymbol{\theta}_{c}, \; t) \cdot \mathbf{e}_{n}(\mathbf{r}, \; \omega_{i}))\mathbf{e}_{n}(\mathbf{r}, \; \omega_{i}), \; i = 1, \; \dots, \; N_{ns}.$$

S<sub>1</sub> 1 2

射影成分の変動量

veval, k ( $\omega_i$ ), k = 1, ..., Ntest

を以下のいずれか方法で算出

$$v_{\text{eval, k}}(\omega_i) = \left( H_{\text{m, q}}^{\text{P}}(\mathbf{r} - \mathbf{r}_{\text{c}}, \theta_{\text{c}}, \omega_i, t) \right)_{T_{\text{c, k}}}, q = 1, 2; k = 1, ..., N_{\text{test}}; i = 1, ..., N_{\text{ns}}.$$

または

$$v_{\text{eval. }k}(\omega_i) = \left\langle \mathbf{H}_{\text{m}}^{P}(\mathbf{r} - \mathbf{r}_{\text{c}}, \ \boldsymbol{\ell}_{\text{c}}, \ \omega_i, \ t) \right\rangle_{T_{\text{c.k}}}, \ k = 1, \dots, N_{\text{test}}; \ i = 1, \dots, N_{\text{ns}}.$$

または

$$v_{\text{eval, k}}(\omega_{i}) = \left( (H_{\text{m, q}}^{P}(\mathbf{r} - \mathbf{r}_{c}, \theta_{c}, \omega_{i}, t))^{2} \right)_{\mathbf{T}_{c,k}},$$

$$q = 1, 2; k = 1, ..., N_{\text{test}}; i = 1, ..., N_{\text{ns}}.$$

または

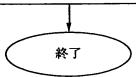
$$v_{\text{eval, k}}(\omega_{i}) = \sqrt{\left(\left(H_{\text{m, q}}^{P}(\mathbf{r} - \mathbf{r}_{c}, \theta_{c}, \omega_{i}, t)\right)^{2}\right)_{T_{\text{c, k}}}},$$

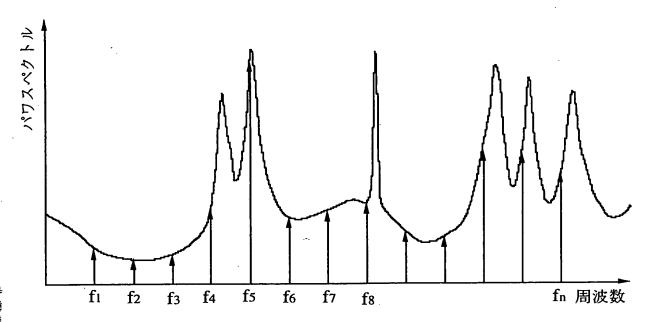
$$q = 1, 2; k = 1, ..., N_{\text{test}}; i = 1, ..., N_{\text{ns}}.$$

S,1 1 3

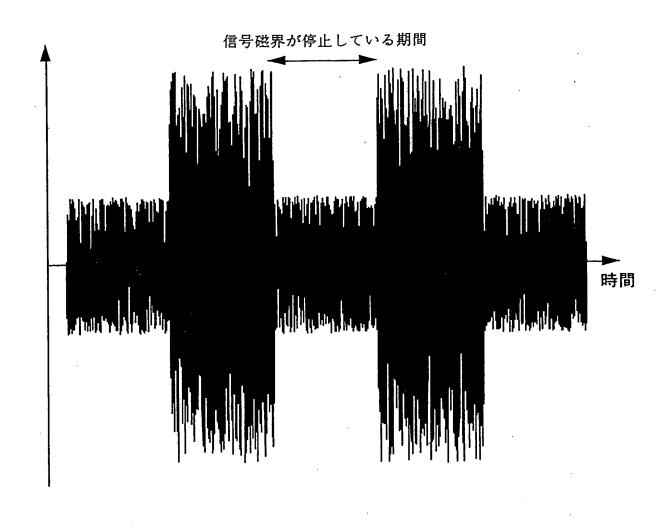
以下の分散が最小となる候補ベクトルを雑音磁界の方向として採用

$$\operatorname{var}(\omega_{i}) = \frac{\sqrt{\operatorname{mean}_{k((v_{\text{eval.}k}(\omega_{i}) - \operatorname{mean}_{k}(v_{\text{eval.}k}(\omega_{i})))^{2})}}}{\operatorname{mean}_{k}(v_{\text{eval.}k}(\omega_{i}))}, i = 1, \dots, N_{\text{ns}}$$





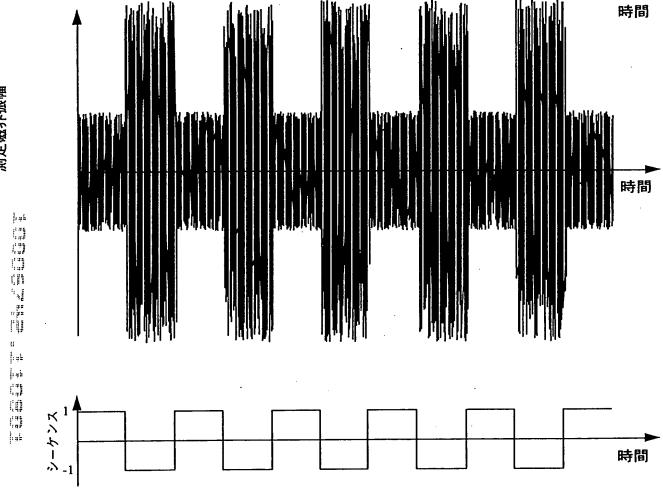
The state of the s



信号磁界

Off





Off

On

Off

Off

